Remarks

As stated above, the applicants appreciate the Examiner's thorough examination of the subject application and request reexamination and reconsideration of the subject application in view of the preceding amendments and following remarks.

Concerning Item 1 of the subject action, the Examiner objects to claim 22 due to an informality that reads "A gas detector according to claim xx4". The Examiner suggests that claim 22 be amended to read "A gas detector according to claim 19".

Applicants have amended claim 22 to identify the proper dependence.

Concerning Items 2-3 of the subject action, the Examiner rejects claims 1, 28, and 29 under 35 USC §102(e), as being anticipated by Syllaios et al. (U.S. Patent 6,297,511; hereinafter Syllaios).

Applicants claim (in independent claim 1):

> A narrow band incoherent radiation emitter detector comprising: (A) a planar filament emission/detection element characterized by (B) a predetermined spectral range of emitted/detected radiation and (C) a emission/detection width of dl/l less than about 0.1, where l is the wavelength of said radiation.

Applicants respectfully assert that Syllaios fails at least to disclose or suggest element (C) of applicant's independent claim 1, namely "a planar filament emission/detection element characterized by a emission/detection width of dl/l less than about 0.1, where l is the wavelength of said radiation."

Accordingly, applicants respectfully assert that Syllaios is not a proper basis for a 35 USC §102(e) rejection, as the reference fails to disclose each and every element of the applicants' claimed invention.

As is known in the art, Infrared (IR) imaging systems can be used to detect objects such as fires, vehicles, and people for commercial and military applications by detecting differences in thermal radiance of various objects in a scene and by displaying the differences as a visual image of the scene. Typically thermal imaging systems include optics for collecting and focusing IR radiation from a scene, a thermal detector for converting IR radiation into an electrical signal, and additional signal processing equipment (e.g., electronic hardware and/or software) for processing and displaying information that represents the collected radiation. Additionally, for active systems, typically an IR emitter or other IR source is included to introduce IR radiation into the scene.

IR emission sources radiate in a broad spectral manner representative of a blackbody curve. However, most IR applications and products utilize only a small portion of the spectrum relative to that blackbody curve. Thus to generate energy within this small spectral portion, out of band radiation is also generated that can introduce noise into the scene and the IR detector. Such systems inefficiently emit energy across a broad spectrum when the measurement band is only a small fraction of the total emitted spectrum.

To provide spectral efficient IR emissions and detection capabilities, the applicants have claimed "a narrow band incoherent radiation emitter detector that includes a planar filament emission/detection element characterized by a emission/detection width of dl/l less than about 0.1" (emphasis added). By operating in a narrow spectral band in which the ratio of the wavelength range (dl) to center wavelength (l) is less than about 0.1, energy is efficiently radiated substantially within the narrow spectral band.

In contrast, Syllaios does not disclose a narrow band incoherent radiation emitter detector that includes a planar filament emission/detection element characterized by a emission/detection width of dl/l less than about 0.1. Rather, referring to Syllaios' Figure 1, the reference discloses an infrared radiation emitter that is capable of modulating infrared radiation at a relatively high frequency. By modulating the infrared radiation, the reference discloses an emitter that can relatively quickly switch between an emitting state and a non-emitting state. In this regard Syllaios states:

> "The IR radiation emitted from membrane 20 may be modulated by supplying time-varying electrical power to IR emitter 10. For example, with a sinusoidally-varying power input, the emitted radiation is sinusoidally modulated. By varying the electrical power at high frequency, IR emitter 10 can alternately emit radiation and then stop emitting radiation more than one hundred times a second. Because if this high frequency response, the present invention eliminates the requirement of a mechanical chopper to increase the detectivity of IR emitter 10." (col. 6, line 28-39).

Furthermore, while Syllaios' objective is an IR emitter capable of being modulated at a relatively high frequency, Syllaios' IR emitter has broad spectral emission characteristics and does not provide a narrow band incoherent radiation emitter detector that includes a planar filament emission/detection element characterized by a emission/detection width of dl/l less than about 0.1. In particular, Syllaios states:

> "The depth of cavity 50 between reflector 30 and membrane 20 may be sized to produce a desired frequency of IR radiation. For example, cavity 50 may be sized so that IR emitter 10 produces IR radiation at a frequency that can be detected by a corresponding IR detector (not explicitly shown). More specifically, cavity 50 can be sized to emit IR radiation in the mid-wavelength infrared (MWIR) window, which is the *3 micron to 5 micron wavelength range*, and the long wavelength infrared (LWIR) window, which is the *8 micron to 12 micron wavelength range*. Emitter 10 may also emit IR radiation having wavelengths longer than 12 microns if desired." (col. 3, line 49-60) (emphasis added).

Focusing on the mid-wavelength infrared window disclosed by Syllaios, the wavelength range (dl) for this window is 2 micron (i.e., 5 micron wavelength – 3 micron wavelength) and the center wavelength (l) of the range is 4 micron (i.e., the midpoint wavelength of the 3 to 5 micron wavelength window). Using these particular values, the ratio (i.e., dl/l) of wavelength range to center wavelength is 2 micron divided by 4 micron, or 0.5, which is not "less than about 0.1" as claimed in independent claim 1. Furthermore, focusing on Syllaios' long wavelength infrared window, the wavelength range (dl) of this window is 4 micron (i.e., 12 micron wavelength – 8 micron wavelength) and a center wavelength of 10 micron (i.e., the midpoint wavelength of the 8 to 12 micron wavelength window). Using these values, the ratio (i.e., dl/l) of wavelength range to center wavelength is 4 micron divided by 10 micron, or 0.4, which is also not "less than about 0.1" as claimed in independent claim 1.

Thus, while Syllaios discloses an IR emitter that produces board IR wavelength emissions (i.e., dl/l of 0.4 or 0.5), which is modulated at a relatively high frequency, the reference does not disclose or suggest a narrow band incoherent radiation emitter with an emission/detection width of dl/l less than about 0.1.

Accordingly, applicants respectfully assert that Syllaios is not a proper basis for a 35 USC §102(e) rejection, as the reference fails to disclose each and every element of the applicants' independent claim 1. Therefore the applicants respectfully assert that independent claim 1 is patentable over the cited reference. Further, as independent claim 28 includes the element of "an emission/detection width dl/l less than about 0.1", applicants respectfully assert that independent

claims 28 is patentable over the cited reference. Additionally, as claim 29 directly depends upon independent claim 28, applicants respectfully assert that claim 29 is also patentable over the cited reference.

Concerning Items 4-5 of the subject action, the Examiner rejects claims 1-14 under 35 USC §103(a), based in the combination of the teachings of Laine (U.S. Patent 5,864,144; hereinafter Laine) in view of Syllaios.

Similar to Syllaios, Laine does not disclose or suggest a narrow band incoherent radiation emitter detector that includes a planar filament emission/detection element characterized by a emission/detection width of dl/l less than about 0.1.

Accordingly, applicants respectfully assert that the combination of Laine and Syllaios is not a proper basis for a 35 USC §103(a) rejection, as the combination of the references fail to disclose each and every element of the applicants' claimed invention. Therefore the applicants respectfully assert that independent claim 1 is patentable over the combination of the cited references. Further, as dependent claims 2-14 depend (either directly or indirectly) upon independent claim 1, applicants respectfully assert that claims 2-14 are also patentable over the combination.

Concerning Item 6 of the subject action, the Examiner rejects claims 15-27 under 35 USC §103(a), based in the combination of the teachings of Alexay (U.S. Patent 5,584,557; hereinafter Alexay) and Syllaios.

Similar to Syllaios and Laine, Alexay does not disclose or suggest a planar filament emission/detection element characterized by a emission/detection width of dl/l less than about 0.1, where l is the wavelength of said radiation, as recited from independent claims 15 and 23.

Accordingly, applicants respectfully assert that the combination of Alexay and Syllaios is not a proper basis for a 35 USC §103(a) rejection, as the combination of the references fail to disclose each and every element of the applicants' claimed invention. Therefore the applicants respectfully assert that independent claims 15 and 23 are patentable over the combination of the cited references. Further, as dependent claims 16-21 and amended dependent claim 22 depend (either directly or indirectly) upon independent claim 15, applicants respectfully assert that claims 16-22 are also patentable over the combination. Furthermore, as dependent claims 24-27 depend (either directly or indirectly) upon independent claim 23, the applicants respectfully assert that claims 24-27 are also patentable over the combination.

The total number of claims remains the same. Therefore, no additional claim fee is required. An extension fee of $110.00 pursuant to 37 CFR §1.136(a) for a reply within the first month is also enclosed. No new matter has been added by these amendments. The applicants respectfully assert that the subject application is now in condition for allowance. Please apply any charges or credits to deposit account 50-1133.

If the Examiner believes there are any outstanding issues to be resolved with respect to the above-identified application, the Examiner is invited to telephone the undersigned at their earliest convenience so that such issues may be resolved telephonically.

Respectfully submitted,

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